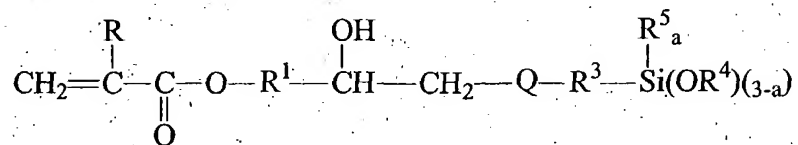


WHAT IS CLAIMED IS:

1. A radiation and moisture curable composition comprising:

(a) a compound within structural formula I:



I

where R is H or a monovalent substituted or unsubstituted C₁₋₆ hydrocarbon radical;

Q is S, O or N (R²);

R¹ comprises a divalent substituted or unsubstituted C₁₋₁₂ aliphatic, cycloaliphatic or aromatic hydrocarbon radical, which may be interrupted with a heteroatom-containing linkage;

R² is H or a monovalent substituted or unsubstituted C₁₋₆ hydrocarbon radical;

R³ comprises a divalent substituted or unsubstituted C₁₋₂₀ aliphatic, cycloaliphatic or aromatic hydrocarbon radical, which may be interrupted with a heteroatom-containing linkage; and

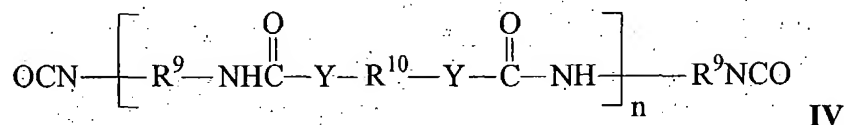
R⁴ and R⁵ may each independently be a monovalent substituted or unsubstituted C₁₋₆ hydrocarbon radical; a is 0 or 1; and

(b) a diisocyanate.

2. The composition of claim 1, wherein R¹ is methylene or a methylenoxy alkylene C₁₋₆ linkage.

3. The composition of claim 1, further comprising a cure system.

4. The composition of claim 1, wherein the diisocyanate is an isocyanate end-capped prepolymer having the structural formula IV:



wherein R^9 and R^{10} may be the same or different, and may be a divalent substituted or unsubstituted aliphatic, cycloaliphatic or aromatic radical or a polyol, polyester, or a polyalkylidene radical; Y is O or NH; and n is an integer from 1 to 100.

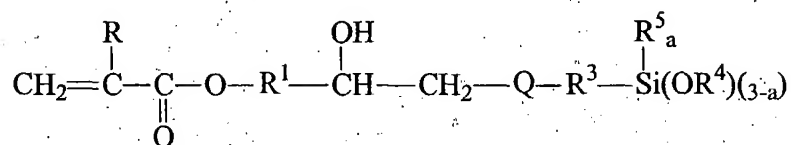
5. The composition of claim 4, wherein R^{10} is polymeric backbone is selected from a group consisting of polyester polyols, polyether polyols and polyhydroxy polycarbonates.
6. The composition of claim 1, wherein R^1 is methyl, Q is oxygen, R^3 is propylene, and R^4 is methyl.
7. The composition of claim 1, wherein R^1 is methyl, Q is NR^2 , R^2 is ethyl, R^3 is propylene and R^4 is methyl.
8. The composition of claim 4, wherein
 R^9 is a diradical formed from isophorone diisocyanate, and
 R^{10} is a diradical formed from hydroxy terminated polypropyleneoxide diol.
9. The composition of claim 4, wherein R^9 is a diradical formed from isophorone diisocyanate and R^{10} is a diradical formed from hydroxy terminated polypropyleneoxidepolyol.
10. The composition of claim 3, where the curing system is selected from the group consisting of 1-hydroxycyclohexyl phenyl ketone, 2-methyl-1-[4-(methylthio)phenyl]-2-morpholino propan-1-one, 2-benzyl-2-N,N-dimethylamino-1-(4-morpholinophenyl)-1-butanone, the combination of 1-hydroxy cyclohexyl phenyl ketone and benzophenone, 2,2-dimethoxy-2-phenyl acetophenone, the combination of bis(2,6-dimethoxybenzoyl-2,4,4-trimethyl pentyl) phosphine oxide and 2-hydroxy-2-methyl-1-phenyl-propan-1-one, and [bis (2,4,6-trimethyl benzoyl) phenyl phosphine oxide], 2-hydroxy-2-methyl-1-phenyl-1-propan-1-one, the combination of 2,4,6-trimethylbenzoyldiphenyl-phosphine oxide and 2-hydroxy-2-methyl-1-phenyl-propan-1-one, dl-camphorquinone, alkyl pyruvates, 2,2-dimethoxy-2-phenyl acetophenone, 2-hydroxy-2-methyl-1-phenyl-1-propane, bis(2,4,6-trimethyl benzoyl) phenyl phosphine oxide, bis(2,6-dimethoxybenzoyl-2,4,4-trimethylpentyl) phosphine oxide, 2-hydroxy-

2-methyl-1-phenyl-propan-1-one, bis(n^5 -2,4-cyclopentadien-1-yl)-bis[2,6-difluoro-3-(1H-pyrrol-1-yl)phenyl]titanium, diethoxyacetophenone and combinations thereof.

11. The composition of claim 3, where the curing system includes a moisture curing catalyst.

12. A composition comprising the reaction product of:

(a) a compound within the structural formula I:



I

where R is H or a monovalent substituted or unsubstituted C_{1-6} hydrocarbon radical;

Q comprises S, O or $\text{N}(\text{R}^2)$;

R^1 comprises a divalent substituted or unsubstituted C_{1-12} aliphatic, cycloaliphatic or aromatic hydrocarbon radical, which may be interrupted with a heteroatom-containing linkage;

R^2 is H or a monovalent substituted or unsubstituted C_{1-6} hydrocarbon radical;

R^3 comprises a divalent substituted or unsubstituted C_{1-20} aliphatic, cycloaliphatic or aromatic hydrocarbon radical, which may be interrupted with a heteroatom-containing linkage; and

R^4 and R^5 may each independently be a monovalent substituted or unsubstituted C_{1-6} hydrocarbon radical; a is 0 or 1; and

(b) a diisocyanate.

13. The composition of claim 12, further comprising a curing system.

14. The composition of claim 13, where the curing system is selected from the group consisting of 1-hydroxycyclohexyl phenyl ketone, 2-methyl-1-[4-(methylthio)phenyl]-2-morpholino propan-1-one, 2-benzyl-2-N,N-dimethylamino-1-(4-morpholinophenyl)-1-butanone, the combination of 1-hydroxy cyclohexyl phenyl ketone and benzophenone, 2,2-dimethoxy-2-phenyl acetophenone, the combination of bis(2,6-dimethoxybenzoyl-2,4,4-trimethyl pentyl) phosphine oxide and 2-hydroxy-2-methyl-1-phenyl-propan-1-one, and [bis (2,4,6-trimethyl

benzoyl) phenyl phosphine oxide], 2-hydroxy-2-methyl-1-phenyl-1-propan-1-one, the combination of 2,4,6-trimethylbenzoyldiphenyl-phosphine oxide and 2-hydroxy-2-methyl-1-phenyl-propan-1-one, dl-camphorquinone, alkyl pyruvates, 2,2-dimethoxy-2-phenyl acetophenone, 2-hydroxy-2-methyl-1-phenyl-1-propanone, bis(2,4,6-trimethyl benzoyl) phenyl phosphine oxide, bis(2,6-dimethoxybenzoyl-2,4,4-trimethylpentyl) phosphine oxide, 2-hydroxy-2-methyl-1-phenyl-propan-1-one, bis(n^5 -2,4-cyclopentadien-1-yl)-bis[2,6-difluoro-3-(1H-pyrrol-1-yl)phenyl]titanium, diethoxyacetophenone and combinations thereof.

15. The composition of claim 13, where the curing system comprises a moisture curing catalyst.

16. A composition comprising the reaction product of:

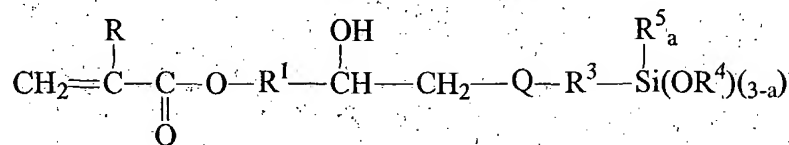
- (i) the reaction product of an epoxidized (meth)acrylate and an alkylaminoalkylene polyalkoxysilane; and
- (ii) a diisocyanate-containing compound or prepolymer.

17. A composition comprising the reaction product of:

- (i) the reaction product of (meth)acrylic acid and epoxidized polyalkoxysilane; and
- (ii) a diisocyanate-containing compound or prepolymer.

18. A method of producing a radiation and moisture curable composition comprising:

- (a) providing a compound with the structural formula I:



I

where R is H or a monovalent substituted or unsubstituted C₁₋₆ hydrocarbon radical;

Q is S, O or N (R²);

R^1 comprises a divalent substituted or unsubstituted C_{1-12} aliphatic, cycloaliphatic or aromatic hydrocarbon radical, which may be interrupted with a heteroatom-containing linkage;

R^2 is H or a monovalent substituted or unsubstituted C_{1-6} hydrocarbon radical;

R^3 comprises a divalent substituted or unsubstituted C_{1-20} aliphatic, cycloaliphatic or aromatic hydrocarbon radical, which may be interrupted with a heteroatom-containing linkage;
and

R^4 and R^5 may each independently be a monovalent substituted or unsubstituted C_{1-6} hydrocarbon radical; a is 0 or 1; and

(b) reacting the compound with a diisocyanate compound.

19. The method of claim 18, wherein in Compound I, R is H or CH_3 ;

R^1 is a methylene linkage;

Q is O;

R^3 is propylene; and

R^4 is methyl.

20. The method of claim 18, wherein R is H or CH_3 ;

R^1 is a methylene linkage;

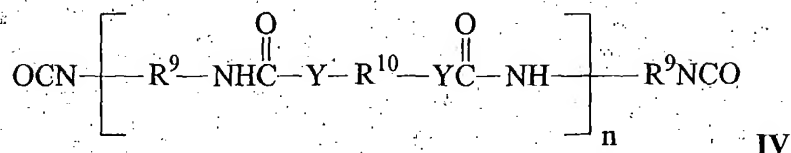
Q is N (R^2);

R^2 is H;

R^3 is propylene; and

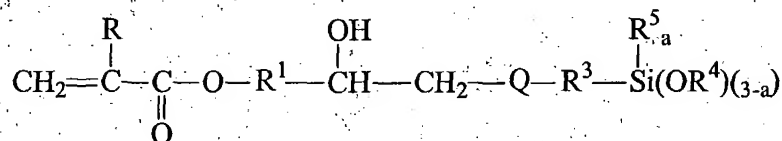
R^4 is methyl.

21. The method of claim 18, wherein the diisocyanate compound is an end-capped prepolymer having the structural formula IV:



wherein R^9 and R^{10} may be the same or different, and may be a divalent substituted or unsubstituted aliphatic, cycloaliphatic or aromatic radical or a polyol, polyester, or a polyalkylidene radical; Y is O or NH; and n is an integer from 1 to 100.

22. A method of using a composition having a reaction product of



I

where R is H or a monovalent substituted or unsubstituted C_{1-6} hydrocarbon radical;

Q is S, O or $N(R^2)$;

R^1 comprises a divalent substituted or unsubstituted C_{1-12} aliphatic, cycloaliphatic or aromatic hydrocarbon radical, which may be interrupted with a heteroatom-containing linkage;

R^2 is H or a monovalent substituted or unsubstituted C_{1-6} hydrocarbon radical;

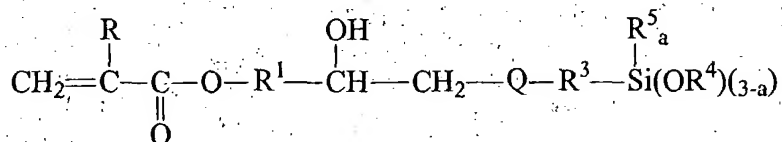
R^3 comprises a divalent substituted or unsubstituted C_{1-20} aliphatic, cycloaliphatic or aromatic hydrocarbon radical, which may be interrupted with a heteroatom-containing linkage;

R^4 is a monovalent substituted or unsubstituted C_{1-6} hydrocarbon radical and a diisocyanate, said method comprising the steps of:

- a) applying the composition onto a surface of a substrate; and
- b) subjecting the composition-applied substrate to a curing mechanism to produce the reaction product.

23. A method of forming a bond comprising the steps of

- a) applying a composition having the reaction product of



I

where R is H or a monovalent substituted or unsubstituted C₁₋₆ hydrocarbon radical;

Q is S, O or N(R²);

R¹ comprises a divalent substituted or unsubstituted C₁₋₁₂ aliphatic, cycloaliphatic or aromatic hydrocarbon radical, which may be interrupted with a heteroatom-containing linkage;

R² is H or a monovalent substituted or unsubstituted C₁₋₆ hydrocarbon radical;

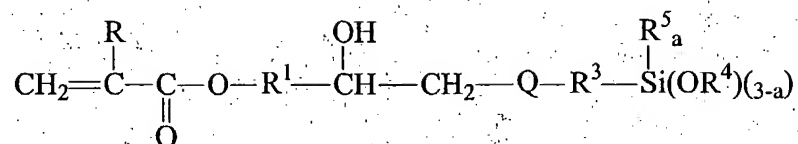
R³ comprises a divalent substituted or unsubstituted C₁₋₂₀ aliphatic, cycloaliphatic or aromatic hydrocarbon radical, which may be interrupted with a heteroatom-containing linkage;

R⁴ is a monovalent substituted or unsubstituted C₁₋₆ hydrocarbon radical and a diisocyanate onto a surface of a substrate; and

b) subjecting said composition to conditions suitable to effectuate cure.

24. A bond comprising a cured composition, wherein said cured composition comprises the reaction product of

a)



I

where R is H or a monovalent substituted or unsubstituted C₁₋₆ hydrocarbon radical;

Q is S, O or N(R²);

R¹ comprises a divalent substituted or unsubstituted C₁₋₁₂ aliphatic, cycloaliphatic or aromatic hydrocarbon radical, which may be interrupted with a heteroatom-containing linkage;

R² is H or a monovalent substituted or unsubstituted C₁₋₆ hydrocarbon radical;

R³ comprises a divalent substituted or unsubstituted C₁₋₂₀ aliphatic, cycloaliphatic or aromatic hydrocarbon radical, which may be interrupted with a heteroatom-containing linkage;

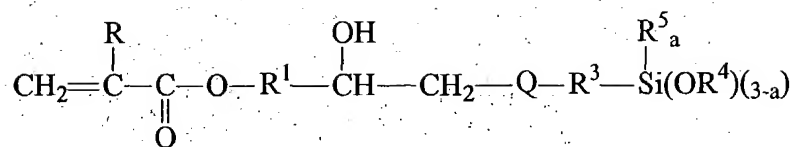
R⁴ is a monovalent substituted or unsubstituted C₁₋₆ hydrocarbon radical and

b) a diisocyanate.

25. An assembly comprising:

a) a composition comprising the reaction product of

a)



I

where R is H or a monovalent substituted or unsubstituted C₁₋₆ hydrocarbon radical;

Q is S, O or N(R²);

R¹ comprises a divalent substituted or unsubstituted C₁₋₁₂ aliphatic, cycloaliphatic or aromatic hydrocarbon radical, which may be interrupted with a heteroatom-containing linkage;

R² is H or a monovalent substituted or unsubstituted C₁₋₆ hydrocarbon radical;

R³ comprises a divalent substituted or unsubstituted C₁₋₂₀ aliphatic, cycloaliphatic or aromatic hydrocarbon radical, which may be interrupted with a heteroatom-containing linkage;

R⁴ is a monovalent substituted or unsubstituted C₁₋₆ hydrocarbon radical, and

b) a diisocyanate, said composition being disposed between two substrates to form a mated assembly; and

c) a second substrate mated to said first substrate, thus forming an assembly.